APPENDIX B

INFORMATION ARCHITECTURE

A. INFORMATION ARCHITECTURES

An information architecture is a framework that portrays relationships among all data and activity components identified in models. It is an abstraction based on the products of the highest level of modeling and is further refined based on the next successive levels of modeling as each area of those detailed levels are completed. At the enterprise level, a strategic information architecture is derived from the enterprise model to identify broad information strategies that will be the basis for strategic data planning. Information architecture leads to the reduction and/or elimination of redundant and inconsistent data. Redundant and inconsistent data are difficult to identify and resolve when an information system, database, file, report, or form is viewed as an isolated collection of data. Separating data from application programs and placing them within logical groupings and precise structures permits the identification, reduction, and control of the redundancies and inconsistencies in data. This is a prerequisite for, and promotes, data sharing.

1. Activity (or process) Architectures

An activity architecture is part of an information architecture. It is the framework for developing applications and defining their interrelationships in support of an organization's information architecture. An activity architecture is part of an information architecture. It identifies the major activities or processes an organization performs and their interrelationships.

2. Data Architectures

a. A data architecture, another part of the information architecture, is a structured method for organizing data, and the information derived from that data, into manageable groupings to facilitate the shared use and control of that information throughout the organization. The data architectures provide the basis for the incremental, ordered design and development of systems and databases based on logical data models. (See Appendix D.)

b. A data architecture is derived from detailed data models. For instance, a strategic data architecture is derived from the enterprise model or strategic data model and shows the relationships among information classes (major groupings of related data) and depicts the fundamental data relationships among Functional Areas or partitions. The data architecture then is abstracted between stages of modeling and updated as the next levels of modeling are completed.

c. Data models and schema(s) are used to depict information needs or

data requirements from a number of views. These views are typically mapped to one another to support the integration of strategic planning, business area planning, system requirements identification, and AIS design, development, and maintenance.

d. Three types of schemas are used to support various perspectives of an organization's data. The American National Standards Institute Standards Planning and Requirements Committee (ANSI/SPARC) has developed what is referred to as a Three Schema (Level) Architecture as described in NIST Special Publication 500-173 (reference (x)). The descriptions go well beyond the definitions for the three schemas contained in the Glossary in this Manual. The descriptions are included here for further understanding.

(1) Conceptual Schema. The conceptual schema represents the logical view, or data administrator's view, of the data requirement. This view is represented as a semantic model of the information that is stored about objects of interest to the Functional Area. This view is a single integrated definition of the *data* that *is unbiased toward* any single application of data *and is* independent of how the data is physically stored or accessed. An attributed, normalized data model is also referred to as a conceptual schema. The conceptual schema is used for data standardization and database design. It provides a consistent definition of the meanings and interrelationships of the data that is used to integrate, share, and manage the integrity of data within and across applications and user communities.

(2) Internal Schema. The internal schema represents the physical view or DBAd's view of the data requirement. This view is described by the data definition language (DDL) and physical storage methods used to implement the data requirements described under a conceptual schema. The denormalization of a conceptual schema may occur be required because of system performance and technological constraints. Any denormalization of the logical data model must be coordinated with the data administrator of the conceptual schema. The internal schema is also referred to as the physical data model. The design and development of internal schema(s) supports integration at the application and local levels.

(3) External Schema. The external schema represents the user view, or application view, of the data requirement. This view is represented by reports, transactions, and screens that are designed to support the individual worker, or groups of workers, in the performance of tasks or activities. The external schema is often referred to as the end-user view.